

## *Fact Sheet*

## *Salivary Diagnostics*

Saliva is the watery fluid that moistens our mouths, helping us to eat, speak, and maintain good oral health. Saliva consists of a clear, protein-rich fluid secreted by the salivary glands and trace amounts of various biochemicals present in blood serum that filter into the mouth. But as certain health conditions arise, such as HIV infection and cancer, more proteins and substances linked to these diseases can pass from the serum into the saliva. Increased concentrations of these compounds over time make saliva a potentially promising diagnostic fluid with several advantages over blood. Saliva is easy to collect, requires no painful needle sticks, and can be tested in many non-traditional settings thanks to the portability and lower cost of salivary test kits.

### **Yesterday**

- Getting a diagnosis meant making a trip to the doctor's office. The doctor's examination often required providing a blood and/or urine sample.
- The blood and/or urine samples were labeled and sent to a laboratory for testing. Typically, patients waited several days for the results. In many cases, they were asked to schedule follow up visits for additional--and often expensive--tests that further narrowed down the possible diagnosis.
- Most tests detected full blown disease. Few were sensitive enough to detect subtle biochemical changes that might be indicative of a developing health condition. No test analyzed saliva or was available for easy use in the home.
- Currently available salivary diagnostic tests include various hormonal, HIV, and alcohol tests. Each test requires a small amount of saliva and produces rapid and highly accurate results. The OraQuick™ HIV test, for instance, reportedly has a 99.8 percent accuracy rate, compared to 99.9 for a blood test.

### **Tomorrow**

### **Today**

- Getting a diagnosis often continues to require scheduling a trip to the doctor's office. But more in-office and home health tests have entered the marketplace. They allow doctors and patients to get immediate yes-or-no answers to diagnostic questions pertaining to diabetes, pregnancy, HIV, and other infectious diseases.
- The faster turnaround allows more rapid communication and decision making, earlier initiation of therapy, better adherence to treatment, and greater patient satisfaction. It also has economic advantages. These include lower costs to perform tests, fewer doctor visits, fewer hospital admissions to run tests, and improved quality of life.
- Scientists have identified the genes and proteins that are expressed in the salivary glands. With these vast catalogues as their guide, they will define the patterns and certain conditions under which these genes and proteins are expressed in the salivary glands and how these parts function as a fully integrated biological system.
- Building on this research, saliva will become a more commonly used diagnostic fluid. Studies indicate saliva may be useful for detecting various cancers, heart disease, diabetes, periodontal diseases, and other conditions.
- Salivary diagnostic tests will provide immediate results to patients. The portable tests will initially approximate the size of a Personal Digital Assistant (PDA). The fully integrated diagnostic systems will have the potential to measure from one to possibly hundreds of compounds in saliva within a matter of minutes.

- As envisioned, a dentist or physician could collect a small saliva sample with a patient's consent, load it into the fully automated test, and have a readout waiting at the end of the appointment. The readout would contain a profile of various proteins in the patient's mouth that are associated with oral and/or various systemic diseases. During subsequent examinations, new salivary profiles could be generated to look for changes that might be indicative of disease.
- As miniaturization of the technology advances, it may become possible to attach a tiny device to a patient's tooth, allowing personalized monitoring of medication levels and the detection of biomarkers for specific disease states.

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